

WHAT IS CLAIMED IS:

1. A method of removing accumulated solids from outer surfaces of porous hollow fiber membranes, wherein the membranes are situated in a vessel, the method comprising the steps of:

backwashing the membranes so as to dislodge accumulated solids from the outer surfaces of the membranes;

providing, by means other than gas passing through the pores of the membranes, gas bubbles to the membranes, wherein the gas bubbles scour the outer surfaces of the membranes; and

removing dislodged accumulated solids from the vessel.

2. The method according to claim 1, wherein the removing step comprises draining down liquid from the vessel.

3. The method according to claim 2, wherein the draining down comprises a periodic draindown.

4. The method according to claim 2, wherein the draining down comprises a continuous draindown.

5. The method according to claim 1, wherein the removing step comprises overflowing liquid from the vessel.

6. The method according to claim 5, wherein the overflowing comprises a periodic overflow.

7. The method according to claim 5, wherein the overflowing comprises a continuous overflow.

8. The method according to claim 1, wherein the backwashing comprises backwashing with a gas.

9. The method according to claim 1, wherein the backwashing comprises backwashing with a liquid.

10. The method of claim 9, wherein the liquid comprises a permeate.

11. The method of claim 1, wherein the steps of backwashing and providing gas bubbles to the membrane occur simultaneously.

12. The method of claim 1, wherein the porous hollow fiber membranes extend longitudinally in an array to form a membrane module contained within the vessel.

13. The method of claim 1, wherein the membranes are mounted in a header in close proximity to one another so as to prevent excessive movement therebetween.

14. The method of claim 1, wherein the gas bubbles move past the outer surfaces of the membranes and vibrate the membranes to dislodge the accumulated solids therefrom.

15. The method of claim 1, wherein the membranes are mounted relative to one another so as to produce a rubbing effect between the membranes when vibrated.

16. The method of claim 1, wherein the hollow fiber membranes are arranged in at least one bundle.

17. The method of Claim 1, wherein the hollow fiber membranes are surrounded by a perforated cage.

18. The method of claim 1, further comprising providing gas bubbles from within the module through gas distribution holes or gas distribution openings in a header.

19. The method of claim 1, further comprising providing gas bubbles from within the module through at least one tube situated within the module.

20. The method of claim 19, wherein the tube comprises a plurality of holes.

21. The method of claim 19, wherein the tube comprises a comb of tubes.

22. The method of claim 1, further comprising subjecting the membranes to a chemical cleaning.

23. The method of claim 1, further comprising subjecting the membranes to a chemical dosing.

24. The method of claim 1, wherein the gas bubbles are continuously provided.

25. The method of claim 1, wherein the gas bubbles are intermittently provided.

26. A method of removing accumulated solids from outer surfaces of porous hollow fiber membranes, wherein the membranes are situated in a vessel, the method comprising:

backwashing the membranes with a liquid so as to dislodge accumulated solids from the outer surfaces of the membranes;

providing, by means other than gas passing through the pores of the membranes, gas bubbles to the membranes, wherein the gas bubbles scour the outer surfaces of the membranes; and

removing dislodged accumulated solids from the vessel.

27. A method of removing accumulated solids from outer surfaces of porous hollow fiber membranes, wherein the membranes are situated in a vessel, the method comprising:

backwashing the membranes with a gas so as to dislodge accumulated solids from the outer surfaces of the membranes;

providing, by means other than gas passing through the pores of the membranes, gas bubbles to the membranes, wherein the gas bubbles scour the outer surfaces of the membranes; and

removing dislodged accumulated solids from the vessel.

28. A method of removing accumulated solids from outer surfaces of porous hollow fiber membranes, wherein the membranes are situated in a vessel, the method comprising:

backwashing the membranes so as to dislodge accumulated solids from the outer surfaces of the membranes; thereafter

providing, by means other than gas passing through the pores of the membranes, gas bubbles to the membranes, wherein the gas bubbles scour the outer surfaces of the membranes; and thereafter

removing dislodged accumulated solids from the vessel.

29. A method of removing accumulated solids from outer surfaces of porous hollow fiber membranes, wherein the membranes are situated in a vessel, the method comprising:

backwashing the membranes so as to dislodge accumulated solids from the outer surfaces of the membranes, while simultaneously providing, by means other than gas passing through the pores of the membranes, gas bubbles to the membranes, wherein the gas bubbles scour the outer surfaces of the membranes; and thereafter

removing dislodged accumulated solids from the vessel.